
Miscellaneous Notes on *Sphagnum*—12

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ABSTRACT. Based on unique combinations of characters, five new species, *Sphagnum* [sect. *Sphagnum*] *matogrossense*, *Sphagnum* [sect. *Sphagnum*] *hertelianum*, *Sphagnum* [sect. *Sphagnum*] *trollii*, *Sphagnum* [sect. *Subsecunda*] *uruguayense*, and *Sphagnum* [sect. *Acutifolia*] *amazonense*, are added to the rich *Sphagnum* flora of South America.

Key words: South America, Sphagnaceae, *Sphagnum*.

For many years I have given special attention to the genus *Sphagnum* in South America. I find it frustrating that the genus is so abundantly represented there, particularly in Brazil, and so poorly known. I have taken a cautious approach to the genus in North America, where the flora and its ecological relationships are so well known. The species are not very numerous, and most of them can, in fact, be recognized in the field by aspect and ecological niche. But I have found it necessary to describe many new species from South America, partly because collections are relatively few and partly because I do not know the multiplicity of habitats available to the genus or phytogeographic relationships between the floras. Even in the case of common species, every specimen has to be studied in minute detail before deciding whether it has been described before, and it is not possible to determine the range of variability from the relatively few collections available. The species differ mainly in microscopic structures that may indeed vary with the habitat, but the kind of information given on the labels is virtually meaningless. Even though I consider these five new species (and the many other novelties that I have offered in description) fully justified, further collection and study will be necessary to evaluate them.

Sphagnum* [sect. *Sphagnum*] *matogrossense
Crum, sp. nov. TYPE: Brazil. Ponte da Pedra:
Matto Grosso, June 1909, F. C. Hoehne 2147
(holotype, M). Figures 1–6.

Epidermis caulina stratis 3, subtiliter fibrosis vel efibrosis, parietes exteriores cellularum superficialium fora-

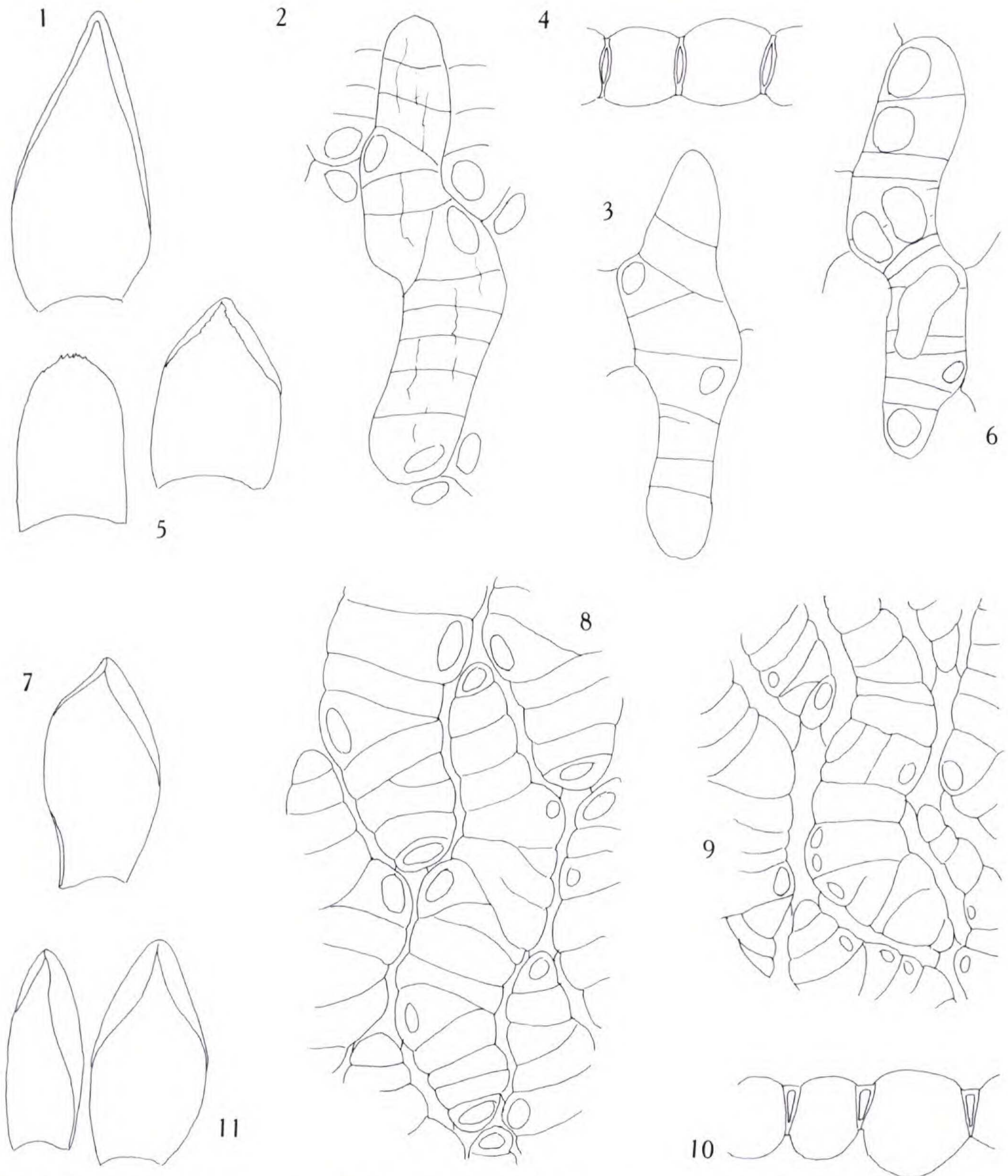
mine uno vel duo (raro tres); cylindrus lignosus atro-rufus. Folia caulina ad 1.4 mm longa, ad apicem fibrosa; cellulae hyalinae superficie exteriore lacunis rotundis vel oblongis, interiore lacunis nullis sed aliquando poris parvis in cellularum angulis. Rami duo; cellulae epidermidis subtiliter fibrosae vel efibrosae, poris unis. Folia ramulina ad 3 mm longa; cellulae hyalinae superficie exteriore 1–3 poris in cellularum angulis conjunctis, interiore poris nullis; cellulae chlorophylliferae sectione transversali ellipticae vel fusiformae, utroque latere foliorum liberae.

Pale, tawny plants up to about 6 cm high. Stem cortex 3-layered, the epidermal cells short, delicately fibrillose or not at all, 1–2(–3)-porose; wood cylinder very dark, blackish brown. Stem leaves pale brown, ca. 1.4 mm long, lingulate and rounded at a fringed apex but shortly concave-pointed; hyaline cells undivided, fibrillose on both surfaces toward the apex, sometimes as much as ¼–½ the leaf length, on the outer surface with 3–5 large, rounded, oblong, or irregular gaps, on the inner surface without gaps but occasionally with a small, ringed corner pore. Branches in fascicles of 2 (1 spreading); cells of cortex delicately or not at all fibrillose, with 1 large pore. Branch leaves somewhat spreading, 2.8–3 mm long, broadly ovate-acute, deeply concave; hyaline cells fibrillose on both surfaces, on the outer surface with 1–3 end and corner pores, grouped in threes at adjacent corners, commonly with membrane pleats, on the inner surface with pores none; green cells central and elliptic, exposed on both surfaces but with thickened cell ends.

The plants resemble *Sphagnum ouropretense* C. Müller & Warnstorf in having stems with a very dark, blackish brown wood cylinder, but the stem leaves have hyaline cells fibrillose only toward the apex, branches in fascicles of two, and hyaline cells of branch leaves commonly membrane-pleated.

Sphagnum* [sect. *Sphagnum*] *hertelianum Crum, sp. nov. TYPE: Venezuela. Estado Bolívar: Kweikin-ima Tepuy (= Cerro Guaiquinima), 05°47'N, 63°51'W, 1500–1550 m, blanket bog with scattered rock outcrops and mossy dwarf forest, submerged, 13–15 Feb. 1990, H. Hertel 36,606 (holotype, M; isotype, MICH). Figures 7–11.

[†] Deceased 30 April 2002. Dr. Crum had essentially completed the manuscript for this article. With help from Steven P. Churchill (MO), Crum's manuscript was lightly edited in June 2002 by Marshall R. Crosby (MO).



Figures 1–11. *Sphagnum matogrossense* and *S. hirtellianum*. 1–6. *S. matogrossense*. —1. Branch leaf, $\times 30$. —2. Upper cell of branch leaf, outer surface, $\times 320$. —3. Upper cell of branch leaf, inner surface, $\times 320$. —4. Portion of branch leaf in section, $\times 320$. —5. Stem leaves, $\times 30$. —6. Upper cell of stem leaf, outer surface, $\times 320$. 7–11. *Sphagnum hirtellianum*. —7. Branch leaf, $\times 30$. —8. Upper cells of branch leaf, outer surface, $\times 320$. —9. Upper cells of branch leaf, inner surface, $\times 320$. —10. Portion of branch leaf in section, $\times 320$. —11. Stem leaves, $\times 30$.

Plantae parvae, columniformes, pallide incarnato-fuscae. Epidermis caulina et ramulina subtiliter vel haud fibrillosa. Folia caulina et ramulina similia; cellulae hyalinae superficiei exterioris poris magnis ternis in angulis conjunctis instructa, interiore poris et pseudoporis parvis commissuralibus numerosis. Rami 2-fasciculati, subaequales. Folia ramulina cellulis chlorophylliferis sectione transversali \pm triangulis, superficiei interiore expositis.

Small, columnar, pale pinkish brown plants, up to 4 cm high. Stems dark red-brown; cortical cells

in 2 layers, short, uniporose, delicately fibrillose or non-fibrillose; wood cylinder blackish brown. Stem leaves 2.5 mm long, oblong-lingulate, concave, broad at the apex but concave-pointed, bordered by a resorption furrow; hyaline cells non-septate, fibrillose throughout, on the outer surface with large, ringed pores in threes at adjacent angles and also singly at side corners, on the inner surface with ringed elliptic pores at corners and numerous

smaller pores and pseudopores at commissures, often in series of 2–5. Branches paired, subequal, about 5 mm long, both directed upward and crowded; epidermal cells uniporose, delicately fibrillose. Branch leaves 2.5–3 mm long, oblong-ovate, tapered to the apex, concave, bordered by a resorption furrow; hyaline cells similar to those of stem leaves; green cells triangular, exposed on the inner surface (and sometimes narrowly exposed on the outer), the hyaline cells convex on the inner surface, bulging on the outer.

The plants have an interesting columnar form owing to short branches crowded together and directed upward. The branches are in fascicles of two and similar in size and form (neither pendent). The cortical cells of stems and branches are weakly fibrillose, if at all. The stem and branch leaves are similar. They have, on the outer surface, large, ringed, elliptic pores conspicuously in threes at adjacent angles and, on the inner surface, a few rather large corner pores in addition to numerous small pores and pseudopores at the commissures, often in series of 2 to 5.

Sphagnum [sect. *Sphagnum*] **trollii** Crum, sp. nov.
TYPE: Colombia. Páramo de Boquerón bei Bogotá, 3900 m, *C. Troll* (holotype, M). Figures 12–16.

Plantae ca. 4 cm altitudine, fulvae. Caules subfusci; cellulae epidermidis caulinae fibrillosae, 1–3-porosae; cylindrus lignosus obscure rufo-brunneus. Folia caulina eis ramulinis similia sed plus lingulata, 1.5–1.8 mm longa; cellulae hyalinae fibrillosae, non septatae, superficie exteriore poris commissuralibus ellipticis (sursum ca. 5, deorsum 8–9), sub apicibus lacunis magnis, interiore plerumque poris nullis. Folia ramulina 2–2.2 mm longa, ovata; cellulae chlorophylliferae orciformes, superficie utroque anguste expositae.

Plants tawny, up to 4 cm high. Stems brown; cortex 3-layered, the epidermal cells fibrillose, 1–3-porose; wood cylinder dark red-brown. Stem leaves much like branch leaves in structure, though smaller, 1.5 mm long and more nearly lingulate, bordered by a resorption furrow; hyaline cells fibrillose, undivided, on the outer surface with elliptic commissural pores, about 5 toward the apex and 8 or 9 below, near the apex with large gaps, on the inner surface with scarcely any pores. Branches in fascicles of 3 (2 short and spreading); cells of the epidermis uniporose, eifibrillose or some few cells fibrillose. Branch leaves 2–2.2 mm long, ovate; hyaline cells with fewer pores but otherwise similar to stem leaves; green cells orciform, narrowly exposed on both surfaces, more so on the outer.

The dark wood cylinder of stems and similar

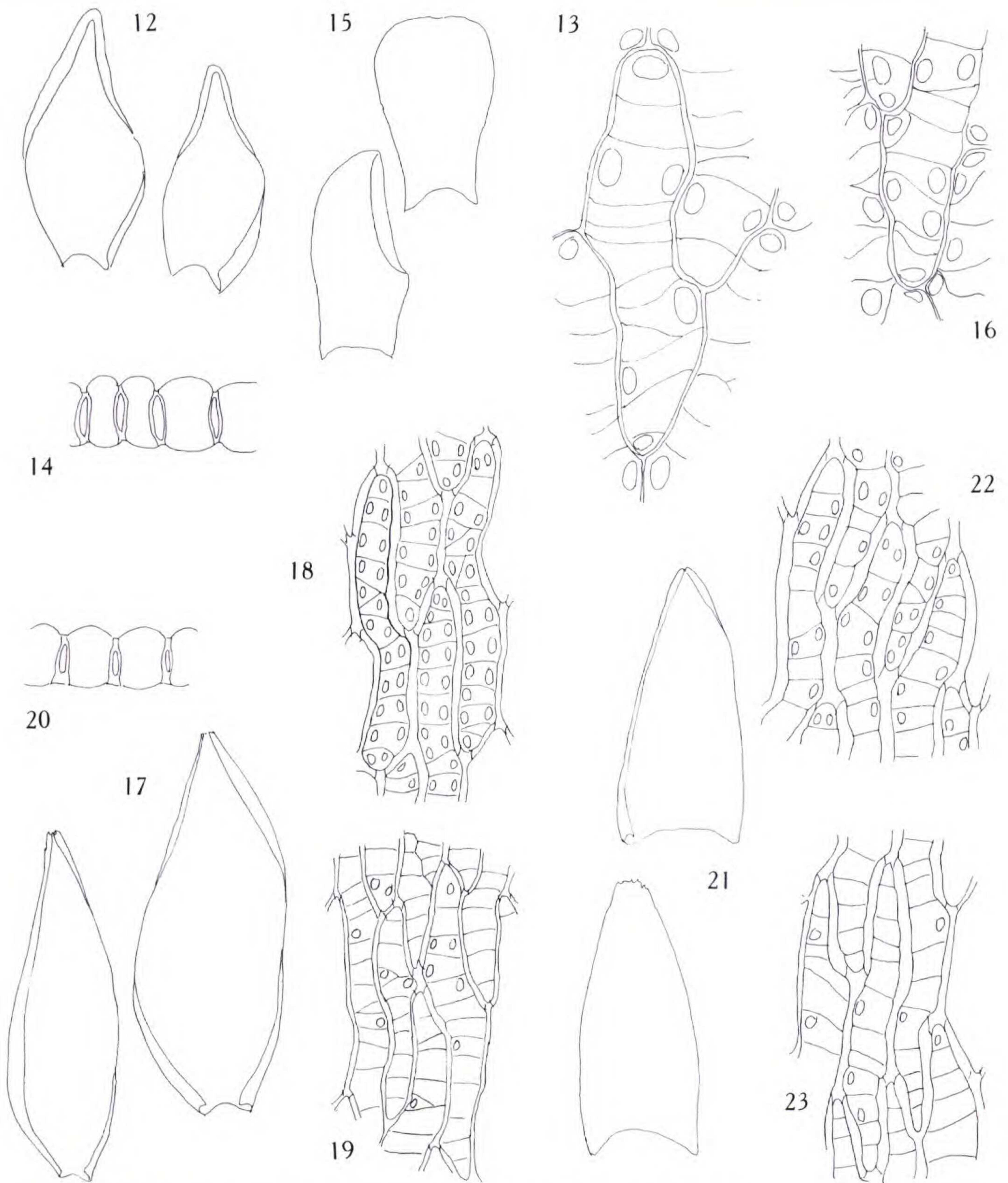
stem and branch leaves are especially interesting. *Sphagnum lapazense* Crum also has a dark wood cylinder and similar stem and branch leaves, but the stem cortex is only 1-layered and lacks pores and fibrils, and the leaves have only a few pseudopores on the outer surface but numerous true pores on the inner.

Sphagnum [sect. *Subsecunda*] **uruguayense** Crum, sp. nov. TYPE: Uruguay. Depto. Montevideo, Carrasco, in ripariis aren.-arg., 25 Oct. 1934, *W. G. Herter 1432a* (holotype, M). Figures 17–24.

Hyalodermiss caulis strato uno, cellulis parvis, indistincte diversis; cylindrus lignosus brunneus. Folia caulina 1.5–1.8 mm longa, oblongo-ovata, rotundo-obtusa; cellulae hyalinae superficie exteriore numerosae, interiore paucae. Fasciculus ramorum ramis 3 (2 patentibus). Folia ramulina 2 mm longa, oblongo-ovata vel oblongo-lanceolata, concavo-acuminata; cellulae hyalinae superficie exteriore poris commissuralibus numerosis, interiore poris paucis; cellulae chlorophylliferae anguste triangulo-trapezoideae, sectione transversali superficie exteriore anguste expositae.

Plants rather small, yellowish green. Cortical cells of stem small and inconspicuous, in 1 layer; wood cylinder brown. Stem leaves 1.5–1.8 mm long, oblong-ovate, rounded-obtuse, somewhat concave above, narrowly bordered; hyaline cells fibrillose in the upper $\frac{1}{2}$ – $\frac{2}{3}$, occasionally once- or even twice-divided, on the outer surface with as many as 8 commissural pores, on the inner surface with pores few, small, and rounded. Branches in fascicles of 3 (2 spreading). Branch leaves not at all secund, 2–2.1 mm long, oblong-ovate or oblong-lanceolate, concave; hyaline cells not or rarely divided, on the outer surface with numerous small, rounded-elliptic commissural pores in nearly continuous rows, on the inner surface with few small, rounded pores; green cells in section narrowly triangular-trapezoidal, narrowly exposed on both surfaces, more so on the outer.

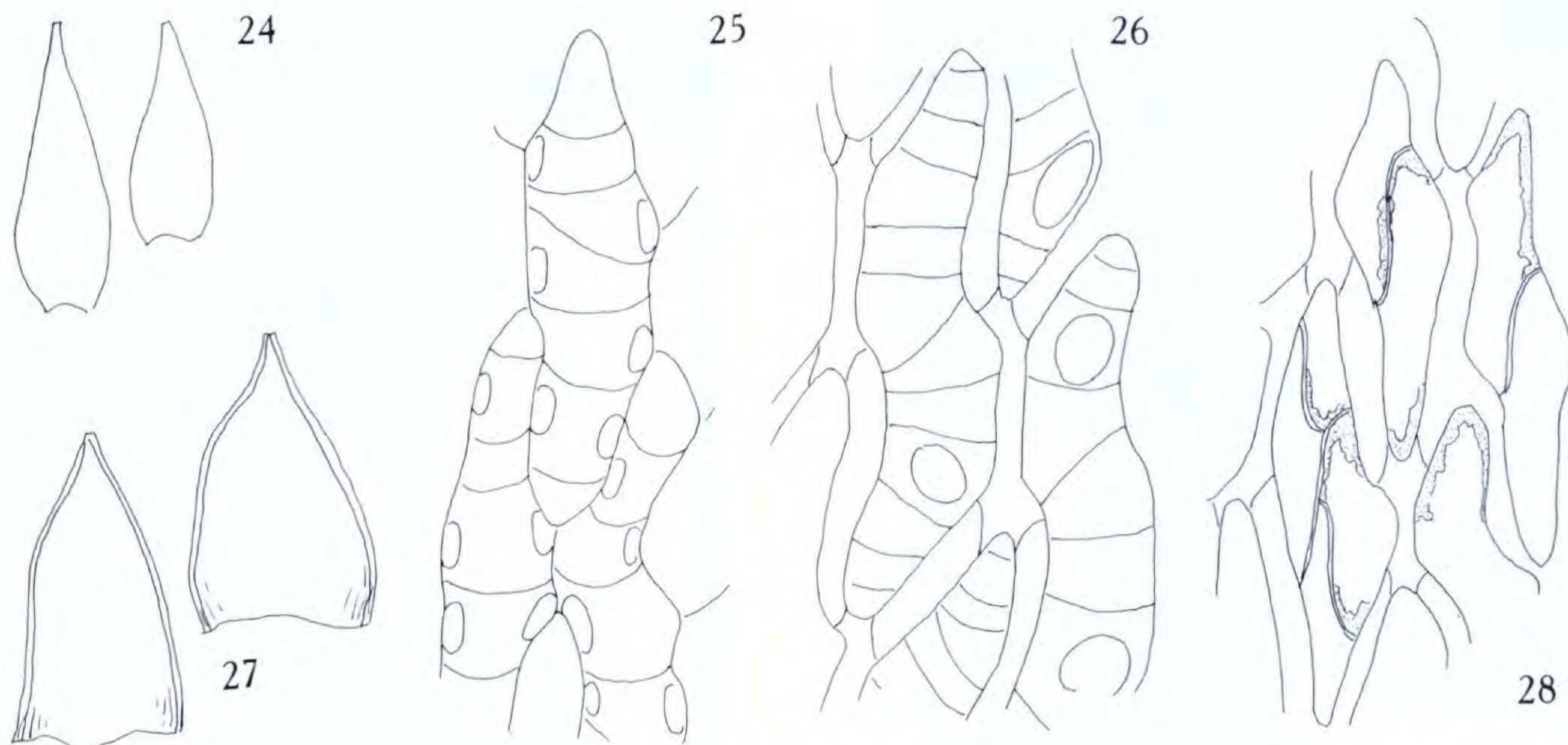
Herter distributed this material as *S. medium* Limpricht var. *affine*, nom. inval., and in aspect it indeed resembles the section *Sphagnum* to which that species belongs. However, it has none of the diagnostic features of that section, and the small pores of both stem and branch leaves are commissural in arrangement and numerous, as in most of section *Subsecunda*. Notable features include the unusually small cortical cells of the stem as well as the relatively few small, rounded pores on the inner surface of both stem and branch leaves and more numerous, small, rounded-elliptic pores on the outer surface, those of the branch leaves in nearly continuous commissural rows.



Figures 12–23. *Sphagnum trollii* and *S. uruguayense*. 12–16. *S. trollii*. —12. Branch leaves, $\times 30$. —13. Upper cells of branch leaf, outer surface, $\times 320$. —14. Portion of branch leaf in section, $\times 320$. —15. Stem leaves, $\times 30$. —16. Upper cells of stem leaf, outer surface, $\times 320$. 17–23. *Sphagnum uruguayense*. —17. Branch leaves, $\times 30$. —18. Upper cells of branch leaf, outer surface, $\times 320$. —19. Upper cells of branch leaf, inner surface, $\times 320$. —20. Portion of branch leaf in section, $\times 320$. —21. Stem leaves, $\times 30$. —22. Upper cells of stem leaf, outer surface, $\times 320$. —23. Upper cells of stem leaf, inner surface, $\times 320$.

Sphagnum [sect. *Acutifolia*] ***amazonense*** Crum, sp. nov. TYPE: Peru. Amazonas: Chachapoyas District, Las Palmas zw. Balsas u. Leimemba, $06^{\circ}45'S$, $77^{\circ}49'W$, 3000 m, 31 Aug. 1973, P. & E. Hegewald 6996 (holotype, MO). Figures 24–28.

Plantae fulvellaе, ca. 6 cm altae. Cellulae epidermidis caulinae sine poris; cylindrus lignosus rutilus. Folia caulina 1.2 mm longa, subtriangularia, parce concava, valde limbata, deorsum \pm dilatata; cellulae hyalinae efibrillosae, plerumque 1(–2)-septatae, utroque superficie lacuna magna perforata. Folia ramulina 1.1–1.2 mm longa, anguste ovata, concava, ca. 3 seriebus cellularum elongatar-



Figures 24–28. *Sphagnum amazonense*. —24. Branch leaves, $\times 30$. —25. Upper cells of branch leaf, outer surface, $\times 320$. —26. Upper cells of branch leaf, inner surface, $\times 320$. —27. Stem leaves, $\times 30$. —28. Upper cells of stem leaf, inner surface, $\times 320$.

um limbata; cellulae hyalinae superficie exteriori poris annulatis ellipticis numerosis ad commissuras, interiore poris 1–3, rotundis, non annulatis; cellulae chlorophylliferae sectione transversali triangulae, dorso foliorum expositae; cellulae hyalinae utroque superficie valde convexae.

Plants tawny, about 5 or 6 cm high. Stem cortex without pores; wood cylinder red-yellow. Stem leaves 1.2 mm long, ovate-triangular, acute, slightly concave, heavily bordered by 4–5 rows of cells, the border somewhat expanded toward the base; hyaline cells 1–2-divided, e fibrillose, with a large gap on both surfaces. Branches in fascicles of 3 (1 pendent). Branch leaves 1.1–1.2 mm long, narrowly ovate, concave, bordered by about 3 rows of linear cells; hyaline cells on the outer surface with nu-

merous (up to 9) ringed, elliptic commissural pores, on the inner surface with 1–3 rounded, unringed pores; green cells triangular, exposed on the inner surface, the hyaline cells bulging on both surfaces.

The plants have stem leaves that are more or less triangular, acutely pointed, and very slightly concave; the hyaline cells are e fibrillose and once or twice divided and have large membrane gaps on both surfaces. The branch leaves have rather numerous elliptic commissural pores on the outer surface and as many as three, rather large, rounded, thin-margined pores (or gaps) on the inner surface; the green cells are exposed on the inner surface, and the hyaline cells are bulging on both surfaces.